

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

Docket No.: 003510-099

Takahiro Ishizuka

Application No. : 09/887,103

Group Art Unit: 1714

Confirmation No.: 7294

Examiner: Callie E. Shosho

Filed: June 25, 2001

For: COLORED PARTICULATE DISPERSION, INK FOR INK-JET RECORDING  
USING THE SAME, AND INK-JET RECORDING METHOD

**DECLARATION UNDER 37C.F.R. § 1.132**

Commissioner for Patents

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Alexandria, VA 22313-1450

Sir:

I, Kenji IKEDA, hereby declare and state:

THAT I am a citizen of Japan;

THAT I graduated from Tokyo Metropolitan University, Graduate School of Engineering, with a Master's Degree in Industrial Chemistry in March 1983;

THAT I joined Fuji Photo Film Co., Ltd. (hereinafter, referred to as "Fuji"), in April 1983, and since then I have been working at Fuji's Fujinomiya Research Laboratory (present Digital & Photo Imaging Materials Research Laboratories);

THAT I was engaged in the research and development of thermal recording materials from March 1983 until September 1998, engaged in the research and development of organic pigment dispersion technology from October 1998 until December 2000, and have been engaged in the research and development of ink-jet dye ink (both water-soluble ink and oil-soluble ink) and product commercialization thereof from January 2001 until now;

THAT I am familiar with the prosecution of the above-captioned application; and  
THAT the experimentation set forth below was conducted by me or under my direct supervision.

## EXPERIMENTATION

Water-based inks of the present invention and Ishii et al. (USP 5,302,654, hereinafter referred to as "Ishii") were prepared and compared with each other with respect to properties as ink-jet inks.

Water-based ink of the present invention was prepared in the manner recited under the section of "Preparation of ink 01" in page 77 of the present specification while water-based ink of Ishii was prepared in the manner described in column 6, lines 54-60 (Example 5) of Ishii. Thus prepared water-based inks were loaded in ink-jet printer PM-670C cartridges (manufactured by Epson Co., Ltd.), and images were recorded on ink-jet paper using the same printer. The printing performances were evaluated with respect to the following aspects, and the results are summarized in the Table 1 below.

### <Ink Property>

In the preparation of water-based ink of Ishii, polymer microparticles are produced by preparing a solution of a self-emulsifiable resin in a non-aqueous solvent, dissolving or dispersing an oil soluble dye or pigment in said solution, emulsifying said solution in conjunction with an ethylenically unsaturated monomer into droplets suspended in an aqueous medium, and allowing said ethylenically unsaturated monomer to polymerize in situ (see column 1, lines 50-57 of Ishii). In this respect, the production process of Ishii's ink is different from that of the ink of the present invention. Due to the difference in the production process, the properties (e.g. stability) of these inks largely differ from each other.

### <Discharge stability>

The water-based ink of Ishii caused precipitation, and clogging of the discharge nozzle were observed. Further, discharging troubles occurred during continuous discharge of ink.

<Gloss (permeability)>

The ink of Ishii hardly permeates into porous image-receiving paper, which is widely used as ink-jet image-receiving paper. As a result, sufficient gloss, which is necessary in ink-jet printing, could not be obtained with the ink of Ishii. On the other hand, with the ink-jet ink of the present invention, resin used in the present invention having a low glass-transition temperature ( $T_g$ ) can be deformed and can permeate into such porous image-receiving paper. Accordingly, excellent gloss was obtained with the ink of the present invention.

<Resistance against rubbing>

The ink of Ishii was easily removed when printed paper was rubbed, leading to scratches.

<Blurring (water resistance and moisture resistance)>

When printed on plain paper, although the ink of Ishii had water resistance and moisture resistance to some degree, blurring around images cannot be eliminated completely. Blurring of images was particularly noticeable when the ink of Ishii was printed on porous image-receiving paper, since the ink was not fixed on porous image-receiving paper.

[Table 1]

	Ishii et al.	The present invention
Ink Stability	B	A
Discharge Stability	D	A
Granularity	C	A
Gloss	D	A
Resistance against Rubbing	D	A
Blurring	C	A
Conclusion	Not suitable for use as ink-jet ink	No problem for use as ink-jet ink

Note: Criteria for evaluation is as follows: A: no practical problem, B: slightly inferior, C: inferior, but practically usable, D: not suitable for practical use

In conclusion, while Ishii discloses water-based inks, the inks are not suitable for use as ink-jet ink, in particular with respect to discharge stability, gloss and resistance against rubbing. The ink-jet inks of the present invention showed unexpectedly superior results over the inks of Ishii when used as ink-jet ink.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date:

09/12/2004

Kenji Ikeda  
Kenji IKEDA